

U.S. Department of Energy
Washington, D.C.

ORDER

DOE O 430.2A

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Expiration: 4-15-06

SUBJECT: DEPARTMENTAL ENERGY AND UTILITIES MANAGEMENT

1. OBJECTIVES.

- a. To establish requirements and responsibilities for managing Department of Energy (DOE) energy and utility supplies and services.
- b. To meet or exceed the goals of all laws, Executive orders, and Federal regulations for energy efficiency, use of renewable energy, and water conservation at DOE buildings, laboratories, and production facilities while increasing the use of clean energy sources using a life cycle cost-effective approach. (See paragraph 6, References.)
- c. To accomplish on a Department-wide basis the following energy efficiency leadership goals that apply to energy and utilities management using a life cycle cost-effective approach:
 - (1) Reduce energy consumption per gross square foot for buildings through life cycle cost-effective measures by 40 percent by 2005 and 45 percent by 2010, using a 1985 baseline.
 - (2) Reduce energy consumption per gross square foot (or other unit as applicable) for laboratory and industrial facilities through life cycle cost-effective measures by 20 percent by 2005 and 30 percent by 2010, using a 1990 baseline.
 - (3) Increase the purchase of electricity from nonhydroelectric renewable energy sources by including provisions for such purchases as a component in all future DOE competitive solicitations for electricity. DOE will purchase 3 percent of its total electricity needs from nonhydroelectric renewable energy sources by 2005 and 7.5 percent of its total electricity purchases from nonhydroelectric renewable energy sources by 2010. Nonhydroelectric renewable energy is energy generated from solar, geothermal, biomass, or wind technologies.
 - (4) Increase the purchase of electricity from less greenhouse gas-intensive sources, including, but not limited to, new advanced-technology fossil energy systems and other highly efficient generating technologies.
 - (5) Retrofit or replace all chillers greater than 150 tons of cooling capacity and manufactured before 1984 that use class I refrigerant by 2005.

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Office of Energy Efficiency and Renewable Energy

- (6) Reduce greenhouse gas emissions attributed to facility energy use through life cycle cost-effective measures by 25 percent by 2005 and 30 percent by 2010, using 1990 as a baseline. Greenhouse gas emissions are carbon dioxide emissions calculated from reported energy consumption.

2. CANCELLATION. DOE O 430.2, *In-House Energy Management*, dated 6-13-96. DOE O 430.1A, *Life Cycle Asset Management*, dated 10-14-98, paragraphs related to the planning, acquisition, management, and use of energy and utilities: 6d(2), 6h, 7b(1), 7b(2), and 7e(16).

3. APPLICABILITY.

- a. DOE Elements. This Order applies to all DOE elements, including the National Nuclear Security Administration (NNSA).
- b. Contractors. The Contractor Requirements Document (CRD), Attachment 1, sets forth requirements of this Order that apply to major facility contracts to the extent set forth in the contract. DOE elements may adapt the CRD in accordance with their Performance Agreements for Energy and Utilities Management. Major facilities contractors are responsible for (1) compliance with the requirements of the CRD of this Order regardless of the performer of the work and (2) flowing down the requirements of the CRD of this Order to subcontracts to the extent necessary to ensure contractors' compliance with the requirements.
- c. Exclusions. Services obtained by Power Marketing Administrations that are directly incident to their marketing or transmission programs. Naval Nuclear Propulsion facilities and activities under Executive Order 12344 as set forth in Public Law 106-65.

4. REQUIREMENTS. DOE energy and utilities management must be integrated with other DOE facilities management processes over the facilities' entire life cycles. DOE energy and utilities management processes must include Performance Agreements for Energy and Utilities Management containing performance objectives using a graded approach.

- a. Energy Management. Each DOE site must have an Energy Management Program and develop an Energy Management Plan to contribute to the maximum extent possible using a life cycle cost-effective approach to the following energy efficiency leadership goals.
 - (1) Continuous improvement on an annual basis using a life cycle cost-effective approach toward—
 - (a) Reducing greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990.

- (b) Reducing energy consumption per gross square foot by 30 percent by 2005 and 35 percent by 2010 relative to 1985 for those facilities included within the buildings energy reporting category.
 - (c) Reducing energy consumption by 20 percent per gross square foot by 2005 and 25 percent per gross square foot by 2010 relative to levels in 1990 for those facilities included within the industrial and laboratory facilities energy reporting category.
 - (d) Implementing water efficiency programs and plans. Water efficiency programs are to include not less than four separate water efficiency improvement best management practices published by the Federal Energy Management Program (FEMP). Implementation means incorporating water management plans into facility planning processes and operating plans; applying appropriate operations and maintenance options; reviewing retrofit/replacement options that have been identified within the last 2 years from completed audits; and accomplishing those retrofit/replacement options that are life cycle cost-effective according to the following schedule: 5 percent by 2002; 15 percent by 2004; 30 percent by 2006; 50 percent by 2008; and 80 percent by 2010.
- (2) Annual progress of at least 10 percent toward completing energy and water audits of all facilities, either through energy savings performance contracts or utilities energy efficiency service contracts or other means. Include the Energy Star[®] Building label rating tool into facility audits of office buildings to support applications for the Energy Star Building label.
 - (3) Annual progress toward installing, by January 1, 2005, in DOE-owned buildings, all life cycle cost-effective energy and water conservation measures identified by facility audits.
 - (4) Annual progress toward qualifying office buildings for the Energy Star[®] Building label.
 - (5) Application of sustainable design principles to new buildings. Compliance with 10 CFR 434, Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal Buildings, from conceptual design through commissioning. Although not mandatory, energy efficiency and sustainable design principles should be considered when designing building alterations for the benefit of reduced life cycle costs and enhanced occupant satisfaction.

- (6) Designation of newly designed facilities with significant public access and exposure as Showcase facilities to highlight energy and water efficiency and renewable energy improvements.
- (7) Selection of DOE/EPA Energy Star[®] products, including microcomputers and peripheral equipment, into guide specifications and acquisition systems when acquiring energy using products. Where Energy Star[®] products are not available, selection of products that are in the upper 25 percent of energy efficiency.
- (8) Use of energy efficiency and water conservation as selection criteria when acquiring leased buildings or when renegotiating or extending existing leases. Alternately, the selection of buildings that have the Energy Star[®] Building label when leased space in such buildings is available.
- (9) Through a system of surveys and inspections, continuous identification of energy conservation operational and maintenance deficiencies as compared to federal regulations for energy conservation. Correction of those deficiencies that can be corrected at low cost.
- (10) Minimization of the use of petroleum-based fuels in DOE-owned buildings and facilities by switching to a less greenhouse gas intensive, non-petroleum-based energy source such as natural gas or renewable energy source as measured at the end source when life cycle cost effective. For buildings and facilities that use petroleum-based fuel systems, provide dual-fuel capability where life cycle cost-effective and practicable.
- (11) Increased use of alternative funding mechanisms in lieu of direct appropriations for energy efficiency improvements consistent with good business practices.
- (12) Ensured availability of trained energy managers as needed for the effective implementation of the Energy Management Program.
- (13) Increased use of off-grid generation systems, including solar hot water and solar electric, solar outdoor lighting, small wind turbines, fuel cells, and other technologies, when such systems are life cycle cost-effective and offer other benefits.
- (14) Increased purchase of electricity from less greenhouse intensive sources, as measured at the source, including but not limited to, new advanced technology fossil energy systems and other highly efficient systems.
- (15) Control of electric, gas, and water loads to minimize the cost of utilities and mitigate the impact of disruptions in the supply of energy.

- (16) Performance evaluations of employees and employee incentive programs to reward exceptional performance in increasing energy efficiency, minimizing water waste, reducing energy costs, reducing water costs, and reducing greenhouse gas emissions.
- (17) Outreach programs as needed to motivate employees to become more efficient in their use of energy and to minimize waste.

b. Utilities Management.

- (1) Every site will be supported by a Headquarters program office that will coordinate its utilities management program to provide a consistent corporate approach to facilities management, especially at multiprogram sites.
- (2) Utilities management performance measures will be commensurate with the value and importance of the asset.
- (3) Utilities management performance measures must ensure formal, comprehensive, integrated, documented planning and control methods. These measures will address, but not be limited to, the following:
 - (a) a planning process for utilities acquisition and management and
 - (b) efficient and effective acquisition, management, and use of utilities.
- (4) The process for operation and maintenance of physical assets at the site must ensure efficient and effective management and use of utilities.
- (5) Utilities services must be acquired and disposed of through a DOE prime contract.
- (6) In the acquisition and management of utilities, DOE elements must ensure that all applicable Federal, State, and local laws and regulations are followed.

5. RESPONSIBILITIES.

a. Office of Federal Energy Management Programs.

- (1) Develops DOE policies on energy efficiency, water conservation, and renewable energy and utilities supplies and services.
- (2) Provides technical assistance to and support the planning and budgeting process of DOE elements.

- (3) Acts as the DOE point of contact for external activities and issues relating to utilities and energy at DOE facilities.
- (4) Develops and verifies in conjunction with the field elements and Program Secretarial Officers the performance objectives, measures, and expectations for energy management and utilities management.
- (5) With respect to energy management—
 - (a) Develops, implements, monitors, and reports on the Departmental Energy Management Program.
 - (b) Prepares and updates the Department's Annual Energy Management Implementation Plans.
 - (c) Evaluates the performance of field elements against the objectives, measures, and expectations of the Departmental Energy Management Program.
 - (d) Convenes the Energy Savings Performance Contract (ESPC) Review Board to coordinate concurrences from the DOE Program Office, the Office of the General Counsel and the Office of Management, Budget, and Evaluation for all ESPCs.
- (6) With respect to utilities management:
 - (a) With the Office of the General Counsel, jointly represent DOE consumer interests by intervening, or otherwise participating in, hearings or proceedings before regulating bodies for utilities when these proceedings affect DOE operations.
 - (b) For the acquisition and sale of utilities services, reviews documents, concurs and coordinates concurrences from the DOE Program Office, the Office of the General Counsel and the Office of Management, Budget, and Evaluation for DOE actions. For NNSA actions, recommends approval to NNSA. This review and concurrence for DOE, or review and recommendation for approval to NNSA, also includes selecting candidates for review from a listing of all contracts, contract modifications excluding administrative or incremental funding modifications, or other arrangements with a utility company for energy conservation measures or demand-side management services or other utility incentive programs.
 - (c) Coordinates between program offices and field elements to support a life cycle cost-effective approach to utilities planning, acquisition, and management.

b. Program Secretarial Officers/Administrator NNSA.

- (1) Ensure implementation of programs at their sites that will achieve DOE's key environmental objectives at their sites through pollution prevention and resource conservation.
- (2) Support DOE field element management of utilities and energy management in a manner to ensure initiatives are consistent with planned facility use, while minimizing waste and protecting the safety and health of workers.
- (3) Support FEMP to verify that field elements have utilities management and energy management performance criteria and measures in place to effectively achieve DOE policy and utilities management and energy management goals.
- (4) Support funding for life cycle cost-effective energy efficiency improvements in existing facilities and for the design and construction of new facilities based on a life cycle cost-effective analysis of alternatives.
- (5) Lead in defining, planning, and budgeting for utilities and energy program needs, including operations, facilities, and projects.
- (6) Coordinate with FEMP and field elements to support a life cycle cost-effective approach to utilities and energy management.
- (7) Coordinate reviews of field element performance for utilities and energy management.

c. DOE Field Elements.

- (1) Lead in negotiating energy management and utilities management performance objectives, measures, and annual expectations with their contractors.
- (2) Evaluate, at least annually, the performance of contractors against field and FEMP established performance objectives and leadership goals, measures, and expectations to implement the requirements in paragraph 4.
- (3) Incorporate performance objectives using a graded approach into energy and utilities management processes.
- (4) Prepare initial budget requests and planning for utilities and support budgets at their sites to accomplish energy management objectives.

- (5) Incorporate the CRD into appropriate contracts.
- (6) With respect to energy management—
 - (a) Set individual site goals that contribute to the Department achieving the DOE-wide leadership goals of paragraph 1(c).
 - (b) Implement the Departmental Energy Management Program through energy management programs and energy management plans at their sites.
 - (c) Demonstrate implementation of the requirements and achievement of the goals in paragraph 4 at their sites by providing FEMP with the input for reports required by statute and regulation. Field elements may prioritize implementation of the requirements based on each site's potential for life cycle cost-effective energy efficiency improvements as long as the field element demonstrates continuous progress toward the objectives and leadership goals. Attachment 2 describes the DOE corporate energy cost and consumption reporting system and database, Energy Management System, and the various statutory and regulatory reports provided by DOE to the Administration and Congress.
 - (d) Submit all ESPC proposals to FEMP, in coordination with their line management, for coordination of concurrence, and await notification from DOE's ESPC Review Board to proceed.
 - (e) For new buildings with areas of 10,000 gross square feet or greater, or with an estimated energy use of 500 million British thermal units or greater, submit certification to FEMP at the end of Title II design, including worksheets and summaries that demonstrate that the design meets Federal performance standards for energy efficiency and that the design incorporates sustainable design principles. Attachment 3 contains further guidance.
- (7) With respect to utilities management—
 - (a) Lead the verification of a life cycle cost-effective approach to utilities planning, acquisition, and management in coordination with program offices and FEMP.
 - (b) With General Counsel and FEMP, participate in DOE's utilities intervention process.
 - (c) Submit to FEMP, in coordination with their line management, for concurrence or recommendation for approval to NNSA, all

contracts, contract modifications (excluding administrative or incremental funding modifications), or other arrangements with a utility company for the acquisition and sale of utility services. These utility services include energy conservation measures or demand-side management services or other utilities incentive programs.

6. REFERENCES.

- a. Executive Order 13123, Greening the Government Through Efficient Energy Management, which directed Federal agencies to significantly improve energy management to save taxpayer dollars and reduce emissions that contribute to air pollution. It stresses accountability and leadership by Federal agencies to promote energy efficiency, water conservation, use of renewable energy products, and helping to foster markets for emerging technologies.
- b. Executive Order 13221, Energy Efficient Standby Power Devices, which directed Federal agencies when purchasing commercially available, off-the-shelf products that use external standby power devices, or that contain an internal standby power function, to purchase products that use no more than one watt in their standby power consuming mode, if available, or products with the lowest standby power wattage.
- c. Secretary of Energy Memorandum, Pollution Prevention and Energy Efficiency Leadership Goals for Fiscal Year 2000 and Beyond, dated 11-12-99, which directed Lead Program Secretarial Officers to achieve key pollution prevention objectives through pollution prevention and resource conservation. It also included leadership goals for improving energy usage within DOE facilities, reducing ozone depleting substances and greenhouse gases, and increasing the use of alternative fuels and efficiency of vehicle fleets.
- d. Secretary of Energy Memorandum, Phaseout Goal for DOE's Air-Conditioning and Refrigeration Chillers to Protect the Ozone Layer and to Reduce Energy Costs, dated 12-10-98, which established the initial Departmental goal for the phaseout of Class I ozone-depleting substances—the class of chemicals most destructive to the stratospheric ozone layer.
- e. Secretary of Energy Memorandum, Greening the Government Through Efficient Energy Management—Utility Cost Reductions Applied to Renewable Energy Premiums, dated 9-7-00, which directs Program Secretarial Officers to purchase nonhydroelectric renewable energy whenever overall net cost savings are achieved from competition, rate reductions, or contract negotiations. Nonhydroelectric renewable energy sources include generation from solar, geothermal, biomass, and wind technologies.

- f. Deputy Secretary of Energy Memorandum, Energy Savings Performance Contracting at DOE Sites, dated 6-29-00, which provided DOE field elements with guidelines for accomplishing energy savings performance contracts.
- g. Public Law 94-163, Energy Policy and Conservation Act, 42 United States Code (U.S.C.) 6361, which established a Federal Energy Management Program.
- h. Public Law 95-619, National Energy Conservation Policy Act (NECPA), 42 U.S.C. 8201, which established requirements for life cycle cost analysis and retrofitting of Federal buildings.
- i. Public Law 99-272, Omnibus Budget Reconciliation Act of 1985, 42 U.S.C. 8287, which amended NECPA to authorize Federal agencies to enter into Shared Energy Savings contracts.
- j. Public Law 100-615, Federal Energy Management Improvement Act of 1988, 42 U.S.C. 8251, which amended NECPA to establish the Interagency Energy Management Task Force.
- k. Public Law 102-486, Energy Policy Act of 1992, 42 U.S.C. 8262, which amended NECPA to set Federal energy management requirements through FY 2005 and added water conservation and renewable energy requirements.
- l. 10 CFR Part 434, Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal Buildings, which requires new Federal buildings to meet certain minimum standards.
- m. Federal User's Manual, Performance Standards for New Commercial and Multifamily High-Rise Residential Buildings, which explains 10 CFR Part 434 and provides worksheets and summary certification forms to demonstrate compliance.
- n. 10 CFR Part 436, Federal Energy Management and Planning Programs, which sets forth the rules for energy management and planning programs to reduce energy consumption and promote life cycle cost-effective investments in building energy systems and energy conservation measures for Federal buildings.
- o. 41 CFR Subpart 101-20.107, Energy Conservation, which requires energy-efficient operation of Federal buildings.
- p. 48 CFR Subpart 970.0470, Department of Energy Directives, which prescribes DOE policy pertaining to compliance with requirements incorporated into contracts through use of the clause at 48 CFR Subpart 970.5204-78, Laws, Regulations, and DOE Directives.

- q. 48 CFR Subpart 923.4, Use of Recovered Materials, which prescribes DOE policy pertaining to compliance with requirements incorporated into the contract through use of the clause at 48 CFR Subpart 970.2304, Use of Recovered/Recycled Materials.
- r. 48 CFR Subpart 970.41, Acquisition of Utility Services, which prescribes DOE policy pertaining to contractors that are authorized to acquire utilities services for DOE facilities.
- s. 48 CFR Subpart 970.72, Facilities Management, that prescribes DOE policy pertaining to compliance with energy management requirements incorporated into contracts through use of the clause at 48 CFR Subpart 970.5204-60.
- t. DOE P 450.4, *Safety Management System Policy*, dated 10-15-96, which establishes the Secretary's policy for conducting work safely and integrating safety with the conduct of all phases of work. The Policy includes pollution prevention and waste minimization within the scope of the term "Safety." The Policy is implemented by Department of Energy Acquisition Regulation (DEAR), 48 CFR Subpart 970.5204 (DEAR clause). The DEAR clause requires contractors to develop and implement an integrated system for all work (including any activities associated with pollution prevention, waste minimization, or energy management).
- u. 42 U.S.C. 2204, section 164, Atomic Energy Act of 1954, as amended, which authorizes DOE to enter into utilities contracts for periods not exceeding 25 years for electric utilities services to the Paducah and Portsmouth installations and referral of such utilities contracts to Congress.
- v. 40 U.S.C. 481(a)(3), section 201(a)(3), Federal Property and Administrative Services Act of 1949, as amended, which authorizes the Administrator of the General Services Administration (GSA) to award contracts for utilities services for a period of up to 10 years, and Section 201(a)(4), which authorizes GSA to represent Federal agencies before Federal and State regulatory bodies in proceedings involving utilities services.
- w. 48 CFR Chapter 1, Federal Acquisition Regulation (FAR), Part 41, Acquisition of Utility Services, which provides policies and procedures for acquisition of utilities services.
- x. Letter of 2-12-87 whereby GSA delegated to the Secretary of Energy, in accordance with sections 201(a)(3) and 205(d) of the Federal Property and Administrative Services Act of 1949, as amended (40 U.S.C. 481(a)(3) and 486(d)), the authority to enter into long-term utilities contracts, for a period not to exceed 10 years, for all utilities services (i.e., electric, natural gas, water, sewage, and steam).

7. CONTACT. For answers to questions concerning this Order, contact FEMP at 202-586-5772.
8. IMPLEMENTATION. This Order must be implemented at each site with a site-specific performance measurement system containing performance objectives, measures, and expectations.



SPENCER ABRAHAM
Secretary of Energy

CONTRACTOR REQUIREMENTS DOCUMENT

DOE O 430.2A, *DEPARTMENTAL ENERGY AND UTILITIES MANAGEMENT*

Major facilities contractors managing and operating Department of Energy (DOE), including National Nuclear Security (NNSA), facilities or subcontracting the operation and maintenance of DOE facilities must have a documented energy management program and an energy management plan. Major facilities contractors are responsible for (1) compliance with the requirements of this Contractor Requirements Document (CRD) regardless of the performer of the work and (2) flowing down the requirements of the CRD of this Order to subcontracts to the extent necessary to ensure contractors' compliance with the requirements. The following items are required of the contractor organization using a graded approach.

1. Energy Management Program.

- a. The energy management program must be performance oriented. It must demonstrate continuous and life cycle cost-effective improvements to increase the energy efficiency and effective management of energy and water within DOE's buildings, laboratories, and production facilities while increasing the use of clean energy sources.
- b. The energy management program must be sufficiently staffed with trained energy managers as needed to accomplish life cycle cost-effective energy efficiency improvements at the site and report progress toward statutory and regulatory requirements.
- c. The energy management program must be integrated with site planning, operations, and acquisition systems. Management systems must be in place to report the site's energy consumption and cost for fuels by fuel type and energy category quarterly and report the site's potable water consumption on an annual basis through DOE's Energy Management System (EMS). EMS is a Web-based data collection and reporting system. Management systems must be in place to document and measure progress toward DOE's energy efficiency leadership goals and requirements and to confirm that energy and utilities management performance expectations and water conservation performance expectations are being met or exceeded.
- d. The energy management program must be integrated with the site's Integrated Safety Management System to optimize the efficient use of energy and water while minimizing waste and protecting the safety and health of workers.

2. Energy Management Plan.

- a. The energy management plan must contain short-range (year 2005) and long-range (year 2010) goals commensurate with DOE's energy efficiency leadership goals.

- b. The energy management plan must contain an emergency conservation component to mitigate the effects of a sudden disruption in the supply of fuel oil, natural gas, electricity, and other critical energy supplies.
- c. The energy management plan must be updated annually to contain priority actions scheduled for implementation over the next 2 years.
- d. The energy management plan must exhibit and explain the application of the following requirements.
 - (1) Continuous life cycle cost-effective improvement on an annual basis toward reducing—
 - (a) Greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990.
 - (b) Energy consumption per gross square foot by 30 percent by 2005 and 35 percent by 2010 relative to 1985 for those facilities included within the Buildings energy reporting category.
 - (c) Energy consumption per gross square foot by 20 percent by 2005 and 25 percent by 2010 relative to 1990 for those facilities included within the Industrial and Laboratory Facilities energy reporting category.
 - (d) Water consumption through water efficiency programs and plans to contribute to the Department's objective of accomplishing 80 percent of identified life cycle cost-effective water conservation actions by 2010 using the best management practices published by the Federal Energy Management Program as a guide.
 - (2) Annual progress of at least 10 percent toward completing energy and water audits of all facilities, either through energy savings performance contracts or utilities energy efficiency service contracts or other means. Include the Energy Star® Building label rating tool in facility audits of office buildings to support applications for the Energy Star Building® label.
 - (3) Annual progress toward installing, by January 1, 2005, in DOE-owned buildings, all life cycle cost-effective energy and water conservation measures identified by facility audits.
 - (4) Annual progress toward qualifying office buildings for the Energy Star® Building label by December 31, 2002.

- (5) Application of sustainable design principles to new buildings and building alterations. Compliance with 10 CFR 434, Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal buildings, from conceptual design through commissioning.
- (6) Designation of newly constructed facilities with significant public access and exposure as Showcase facilities to highlight energy efficiency and water efficiency and renewable energy improvements.
- (7) Selection of DOE/EPA Energy Star® products, including microcomputers and peripheral equipment, into guide specifications and acquisition systems. Where Energy Star® products are not available, selection of products that are in the upper 25 percent of energy efficiency.
- (8) Use of energy efficiency and water conservation as selection criteria when acquiring leased buildings or when renegotiating or extending existing leases. Alternately, the selection of buildings that have the Energy Star® Building label when leased space in such buildings is available.
- (9) Through a system of surveys and inspections, continuous identification of energy conservation operational and maintenance deficiencies as compared to Federal regulations for energy conservation, and the correction of those that are low cost.
- (10) Minimization of the use of petroleum-based fuels in DOE-owned buildings and facilities by switching to a less greenhouse gas intensive, non-petroleum-based energy source such as natural gas or renewable energy source as measured at the end source when life cycle cost-effective. For buildings and facilities that use petroleum-based fuel systems, provide dual-fuel capability where cost-effective and practicable.
- (11) Increased use of alternative funding mechanisms in lieu of direct appropriations for energy efficiency improvements consistent with good business practices.
- (12) Ensured availability of trained energy managers as needed to effectively implement requirements.
- (13) Increased use of off-grid generation systems, including solar hot water and solar electric supporting the Million Solar Roofs initiative, solar outdoor lighting, small wind turbines, fuel cells and other technologies, when such systems are life-cycle cost effective and offer other benefits.
- (14) Control of electric, gas, and water loads to minimize utilities costs and mitigate the impact of sudden disruptions in the energy supply. Adopt a

charge program internal to the site for specific customers when needed to curb unnecessary energy consumption or provide accurate usage information.

- (15) Outreach programs as needed to motivate employees to modify behavior to become more efficient in their use of energy and water and to minimize waste.

ENERGY AND EMISSIONS PERFORMANCE REPORTING

1. PURPOSE. To describe the Department of Energy (DOE) data and information gathering systems to support reports required by statute or regulation.
2. BACKGROUND. DOE provides two energy reports to higher authorities. An Annual Report to Congress is required by the National Energy Conservation Policy Act and an Annual Report to the President is required by Executive order 13123, Greening of the Government through Efficient Energy Management. In addition to reporting progress toward different goals, the primary difference between these reports is that the Annual Report to the President requires agencies to provide information regarding specific implementation strategies. The reports overlap by containing some of the same energy cost and consumption data.

To demonstrate progress toward meeting energy goals, DOE Headquarters annually collects textual and numerical information from its field elements. In addition to reporting to higher authorities, DOE also uses the information to budget for energy management activities and to establish priorities and performance metrics for its field elements in the pursuit of energy and utilities management goals. The textual information describes activities or projects at the field sites. The numerical data includes energy cost, energy consumption, and square footage. The energy cost and consumption information is taken from actual bills. For management purposes, DOE rearranges the numerical data obtained from its field elements and calculates standard Federal performance indexes such as British thermal units per gross square foot.

3. ENERGY CONSUMPTION AND COST REPORTING. DOE's historical database and data collection system for energy consumption and cost reporting is the Energy Management System (EMS). It is a Web-based data collection and reporting system. The EMS requires the input of quarterly energy usage by fuel type, cost by fuel type, and gross square footage by energy reporting category. Sites are not required to submit the data on paper.

Sites are responsible for ensuring that the data are current and accurate. The site must complete the data entry for all four quarters by November 15 for the previous fiscal year. Sites are encouraged to enter the data at the end of each quarter rather than waiting to the end of the fiscal year. Access to the data input/data edit functions of EMS is denied starting in January for the previous fiscal year. However, bona fide changes to baseline data and data for the previous fiscal year data may be made after receiving approval from DOE Departmental Energy Management Team within the Office of Federal Energy Management Programs. The Departmental Energy Management Team also authorizes user access to EMS.

The Energy Consumption and Cost Report is the output from the EMS. In addition to containing absolute values for energy consumption and square footage, it contains calculated values such as British thermal units, percent reduction or increase in cost or consumption, and performance indexes such as British thermal units per year per gross square foot. In those cases where DOE sells energy to a non-DOE tenant, only the energy used by DOE is included in the Energy Consumption and Cost Report.

4. ENERGY REPORTING CATEGORIES. Energy usage and cost information is broken down into four energy categories: Buildings, Industrial and Laboratory Facilities, Exempt Facilities, and Vehicles and Equipment.
 - a. Buildings. This category includes buildings where the predominant energy consumed is for comfort heating, cooling, ventilation, lighting, and other housekeeping functions. Office space, warehouses, cafeterias, utility plants, classrooms, medical buildings, maintenance shops, truck repair and maintenance facilities, and administrative computer centers would typically be in the Buildings category.
 - b. Industrial and Laboratory Facilities. Executive Order 13123 established Industrial and Laboratory Facilities as a new end-use category. The Executive order defines Industrial Facilities as any fixed equipment, building, or complex for production, manufacturing, or other processes that uses large amounts of capital equipment in connection with, or as part of, any process or system, and within which the majority of energy use is not devoted to the heating, cooling, lighting, ventilation, or to service the water heating energy load requirements of the facility. Laboratories can include research, academic, or industrial laboratories. Thus, industrial and laboratories are facilities that produce commercial quantities of a product, products manufactured for research and development, or research and analysis. Underground emplacement and mining, beam lines and associated support equipment, mission-related parts manufacturing, mission-related assembly and inspection stations, and research computer centers would typically be considered Industrial and Laboratory Facilities. Further guidance can be found at <http://www.eren.doe.gov/femp/resources/indust.html>.
 - c. Exempt Facilities. Executive Order 13123 states that no facility will be exempt from being included in the energy efficiency improvement goals unless it meets the criteria for exemption issued by the Secretary of Energy. The criteria can be found at <http://www.eren.doe.gov/femp/resources/criteria.html>. The intent of the Executive order is to have a very few facilities exempt from its goals.

Application for exempt status can be made for buildings and facilities in which it is technically infeasible to implement energy efficiency measures or where conventional performance measurement is rendered meaningless by an overwhelming proportion of process-dedicated energy. DOE guidance is that

exempt facilities have to be separately metered and have at least 80 percent of their energy usage for nonhousekeeping functions.

Application for exempt status may also be made for buildings and structures with very low energy usage per square foot (e.g., sheds, outside parking garages). Application for exempt status can also be made for buildings and structures during any year when the energy usage is skewed significantly from normal patterns due to decontamination, decommissioning, major renovations, etc.

Any DOE field element seeking to use the Exempt Facility category must submit justification to DOE's Federal Energy Management Program to demonstrate why it is technically infeasible and why process-dedicated energy may affect the site's ability to meet the goals. The application must include the annual energy use of the facility by fuel type.

Individual buildings that are not metered but meet the definition for an Exempt Facility are to be reported in the Buildings or the Industrial and Laboratory facilities category. Annual renewal of the Exempt Facility application is required.

- d. Vehicles and Equipment. This category includes fuels used in vehicles and equipment for official Government business, on and off DOE sites, that is not reported by the General Services Administration (GSA). GSA's Agency Report of Motor Vehicles Data (Form SF-82) collects acquisition, fuel consumption, and fuel cost data for motor vehicles directly from vehicle fleet managers, including alternative fuel consumption data.

Fuel used in generators, construction equipment, small engines, airplanes, golf-style personnel transportation, trucks, buses, boats, etc., not reported in Form SF-82 are reported in EMS. Any alternative fuels used in vehicles and equipment not reported in Form SF-82, will be reported in accordance with the following.

Fuel Type	Energy Consumed	Factor	Energy Reported
Gasohol	1000 gallons	.90	900 gallons gasoline
Oxygenate	1000 gallons	.89	890 gallons gasoline
Methanol (M85)	1000 gallons	.15	150 gallons gasoline
Ethanol (E85)	1000 gallons	.15	150 gallons gasoline
Compressed natural gas	1000 gallons (gge)	1.0	1000 gallons gasoline
Liquefied natural gas	1000 gallons	73,500	0.0735 million BTU
Compressed natural gas	1000 gallons	29,000	0.029 million BTU
Electricity	1000 kilowatt-hour	3,412	0.003412 million BTU

Electricity must be reported in this category only if it is separately metered and billed from the electricity used in the other categories.

Some states require that retail sales of compressed natural gas be reported in units of gasoline gallon equivalent (gge). This means that a gallon of compressed

natural gas, as registered on the pump, has the same energy content as a gallon of gasoline.

5. ENERGY TO BE REPORTED. Energy is reported by major fuel type. The energy reported into EMS is the energy that is used to support DOE activities and billed (directly or indirectly) to DOE, either through a utilities, fuel, or performance contract. It does not include any energy sold offsite or sold to tenants that are not a part of DOE. All onsite line losses and conversions (except from nuclear sources) must be included as energy consumed. For example:
 - a. Steam is generated at the site for heating and industrial use. The site will report the consumption and cost by type of fuel that is input into the boilers (natural gas, coal, fuel oil). No deductions are taken for line losses or boiler efficiency. If the steam system provides steam to buildings that are in more than one reporting category (e.g., Buildings and Exempt Facilities), the fuel consumption and costs will have to be allocated between the various categories. Steam metering would be required according to Executive Order 13123 guidelines.
 - b. The site operates a combined heat and power plant. The site will report the fuel consumption and cost by type of fuel (natural gas, coal, fuel oil) that is input into the plant. The site will not report any consumption of electricity or steam that is generated by the combined heat and power plant and is used onsite. If electricity or steam is sold offsite by the plant, the equivalent fuel consumption and costs for generating this additional electricity or steam can be taken as credit against the fuel consumption and costs for this plant.
 - c. The site purchases electricity for an offsite customer or another agency. The purchased electricity and costs that are reported are the quantity billed to the DOE site less the amount and associated cost which is transmitted offsite or sold to a non-DOE entity.
 - d. The site purchases bulk propane, liquified natural gas, fuel oil, or any other fuel type and distributes it without metering on an as-needed basis. The total amount of the bulk purchase is reported in the quarter that it is purchased.
 - e. The site has entered into a performance contract. The contract requires the contractor to provide the energy needed to meet the specified space conditions and to operate certain equipment. Under this arrangement the contractor bills DOE (or a contractor operating the site for DOE) for the full cost of services provided rather than in energy units. The contract may have a variable price component in accordance with a fuel price index. The fuel usage and cost by fuel type at any facility that has such a contract for services is to be reported in the EMS. If the contractor is required to bill DOE on an energy usage basis for the amount of steam or electricity that is purchased, the quantities of steam or electricity purchased and their associated costs are reported.

- f. The site has a contractor that is responsible for generating and distributing utilities from Government-owned plants and facilities to other DOE contractors at that site. The contractor distributing the utilities is allowed to charge the other site contractors for the fuel, labor, supplies, and other expenses related to generation and distribution of utilities. The energy usage that is reported in EMS is the energy that is purchased from the utility supplier and not the energy that is distributed to the other DOE contractors by the contractor that has the utilities operations responsibility. The cost that is reported in EMS is the cost paid to the utility company for the commodity and transportation. For example, site Contractor A buys natural gas to burn in a Government-owned steam plant and then sells steam to site Contractor B. Contractor A reports the natural gas usage. Contractor B does not report any steam usage.
- g. The site has a building it is leasing from a private entity under a full-service lease, and the cost of utilities is not charged separately under the lease, then utilities consumption and cost for this building does not have to be reported in EMS. If the site has a lease agreement under which the site pays the utilities directly, the site would report the utilities consumption and costs under EMS. If GSA is responsible for building operations and reports energy use for the leased space to the Federal Energy Management Program, no DOE reporting is required in EMS. However, if DOE is responsible for building operations and GSA does not report energy use, reporting of DOE energy consumption in EMS is required.

6. ENERGY CONVERSION FACTORS.

EMS automatically converts energy sources into British thermal units using the following factors.

Type of Energy	Btu Content	Billion Btu per Reporting Unit
Electricity	3412 Btu/kWh (3)	0.003412 per MWH
Fuel oil (1)	138,700 Btu/gallon	0.1387 per K Gal
Natural gas	1,031 Btu/cubic feet	0.001031 per MCF
Natural gas	1,000,000 Btu/MBtu (3)	0.001 per MBtu
LPG (2)	95,500 Btu/gallon	0.0955 per K Gal
Coal	24,580,000 Btu/short ton	0.02458 per short ton
Purchased steam	1,000 Btu/lb	1.0 per Btu $\times 10^9$
Purchased chilled water	1,000,000 Btu/MBtu	1.0 per Btu $\times 10^9$
Purchased chilled water	12,000 Btu/ton-hours	1.0 per Btu $\times 10^9$
Automotive gasoline	125,000 Btu/gallon	0.125 per K Gal
Diesel (1)	138,700 Btu/gallon	0.1387 per K Gal
Aviation gasoline	125,000 Btu/gallon	0.125 per K Gal
Jet fuel	130,000 Btu/gallon	0.130 per K Gal

(1) Includes all other petroleum distillates not specifically identified; e.g., kerosene and residuals.

(2) Includes propane and butane.

(3) Btu refers to British thermal unit; kWh refers to kilowatt-hours or 1,000 watt-hours; MWH refers to Megawatt-hours or 1,000,000 watt-hours; K Gal refers to 1,000 gallons; MCF refers to 1,000 cubic feet; MBtu refers to 1,000,000 Btu; 1,000 MBtu is $1\text{Btu} \times 10^9$; 1 ton of cooling equals 12,000 Btu per hour.

Utilities suppliers bill customers for natural gas in either million Btus (MBtus), Therms, deca-therms, or hundred cubic feet (CCF). EMS input value is in thousand cubic feet (MCF). EMS converts the MCF value to billion Btus using the factor shown above. For EMS to correctly calculate the Btus, the user must first convert the utilities billing units to MCF. The following factors can be used to calculate the MCF value.

Multiply	By	To Obtain
billing millions Btu	.9699	MCF
billing deca-therms	.9699	MCF
billing Therms	.09699	MCF
billing CCF	.1000	MCF

7. **COSTS TO BE REPORTED.** The costs reported in EMS are the billed cost for the energy consumed. For electricity, the cost includes demand charges and connection charges as well as consumption charges related to both the commodity and transportation. For natural gas, both commodity and transportation charges are included. The cost does not include any site overhead charges for DOE-funded maintenance, repairs, capital improvements, administrative charges, or other such costs related to onsite distribution system operations. The cost for coal, fuel oil, etc., is the cost of the fuel delivered to the site.
8. **SQUARE FOOTAGE TO BE REPORTED.** Building, Industrial and Laboratory Facilities, and Exempt Facilities square footage is reported and used to measure progress toward energy reduction goals. The figure to be reported is the gross square footage shown in the FIMS (Facility Inventory Management System) database. The end-of-the-fiscal-year square footage figure in the FIMS database will be used as the quarterly square footage figure for each quarter in the EMS database. The square footage of a building on September 30 will be the square footage value for the entire year. If a newly constructed building is in full or partial use during September, but the building is not included in the FIMS database as of the end of this fiscal year, the square footage of the building will not be included in the site's total square footage.

Each building and structure at each DOE site is included in the FIMS database. The FIMS record for each building and structure shows the allocation of gross square footage into four categories for energy reporting purposes. The site energy manager and the site FIMS coordinator determine the square footage values that are assigned to each category. The categories are defined below.

- Energy Consuming Buildings/Facilities: Square footage reported under the Buildings category of the Quarterly Energy Conservation Performance Report. This square footage represents the space whose energy usage is reported in the Buildings category.

- Energy Consuming Industrial and Laboratory Facilities: This square footage represents the space whose energy usage meets the definitions for industrial and laboratory facilities. This square footage represents the space whose energy usage is reported in the Industrial and Laboratory Facilities category (FIMS does not currently have a data field to capture square footage in this category and FIMS square footage for this category may come from either the building or metered process category).
- Energy Consuming Metered Process (Exempt Facility): This square footage represents the space whose energy usage is reported in the Exempt Facility category.
- Non-Energy-Consuming Buildings: This is the remaining gross square footage after the allocation to the three categories described above. The value in this category is automatically calculated within FIMS to be any gross square footage not assigned to the previous categories.

9. UTILITY SERVICES CONSUMPTION AND COST REPORTING. The Utility Services Consumption and Cost Report contains annual information about electricity and natural gas purchased by DOE. Data for the report is collected by supply contract. The purpose is to help manage the acquisition of utilities and ensure that DOE obtains the best value for these commodities. The data are needed for effective support of the following field utilities functions.

- Assess the impact of utilities on site and program operating budgets.
- Prepare budgets.
- Develop utilities option studies and procurement plans.
- Plan comprehensive site utilities development.
- Provide a basis for utilities planning and contract negotiations.
- Support interventions in utility rate cases that affect DOE's consumer interest.
- Comply with the GSA authority delegated to DOE.

Instructions for collection of the data needed for the report will be included as part of EMS. Operations offices must coordinate with their sites to determine which office will provide the information needed for the report. The updated annual information must be provided as soon as possible after the end of the fiscal year. The reporting year for the Utility Services and Cost Report must be the same period of time used in the Energy Consumption and Cost Report. DOE field elements are responsible for ensuring that the data are current and accurate. The data include the cost and consumption of all the energy purchased under the supply contract, including energy that is resold to tenants, other agencies, or offsite customers. Cost and consumption for multiple accounts at a site may be aggregated provided they all have the same contract number, utility type, service

voltage or pressure, and rate schedule. Data related to natural gas and electricity transportation contracts are also included. Cost information includes all elements that are included on the utility invoice, including commodity, demand, power factor, transportation, fuel adjustment, facilities charges, taxes, and other charges. Sites that are tenants of another agency and reimburse that agency for energy are included in the reporting requirement. Energy used at leased facilities is not included unless DOE enters into utility contracts for the energy. Onsite generation of electricity, production of natural gas, or vaporization of liquified natural gas are not included in the data collection.

10. GREENHOUSE GAS EMISSIONS REPORTING. The Greenhouse Gas Emissions Report measures progress toward meeting the Greenhouse Gases Reduction goals outlined in Executive Order 13123. This report is a companion report to the Energy Consumption and Cost Report. Sites are not required to submit any additional information for this report. The report is generated automatically by EMS using data from the Energy Consumption and Cost Report. The only greenhouse gas component calculated is carbon dioxide (CO₂). It includes both baseline and current period energy usage and thousand pounds of CO₂ emissions and the corresponding change in usage/emissions. The emissions factor for electricity varies by state or site to reflect the CO₂ emissions for electricity generation sources. The emissions factor for electricity will be updated annually to reflect any changes. All other conversion factors are the same for all sites. The Energy Information Agency (EIA) provides the emissions factors. Sites that can obtain emissions factors from their electricity suppliers to demonstrate that the emissions related to their use of electricity are other than the EIA state emissions factor may propose that another emissions factor be used.
11. WATER USAGE REPORTING. The Water Usage Report is used to measure progress toward the water conservation goal outlined in Executive Order 13123. It includes the FY 2000 baseline and current year potable water usage and cost. Data are reported in million gallons per year and thousands of dollars. Water data is available from one or more of the following sources: facility meters, the local water/wastewater supplier, and/or metered wells and springs. If no actual water usage information is available then the site must estimate its water usage. Water use indexes are available through the Federal Energy Management Program to help in estimating water consumption. After establishment of the water baseline, Federal water usage will thereafter be reported every 2 years beginning in 2002. Further guidance from the Secretary of Energy can be found at <http://www.eren.doe.gov/femp/resources/water.html> and <http://www.eren.doe.gov/femp/resources/waterguide.html>.

ENERGY EFFICIENCY/SUSTAINABLE DESIGN

1. PURPOSE. To describe the Department of Energy (DOE) documentation system in support of statutory and regulatory requirements to apply sustainable design principles, including compliance with Federal performance standards for energy efficiency.
2. BACKGROUND. There are numerous resources for sustainable design. They all stress the efficient use of energy and water. Executive Order 13123 requires all Federal agencies to apply Federal sustainable design principles. In addition, Federal agencies are required by statute and regulation to comply with an energy efficiency standard for the design and construction of buildings and building alterations.
3. ENERGY EFFICIENCY/SUSTAINABLE DESIGN REPORT. DOE uses Energy Efficiency/Sustainable Design Reports to document progress in implementing the steps contained in the *Roadmap for Integrating Sustainable Design into Site-Level Operations*. The report replaces the Energy Conservation Report. Individual reports demonstrate that the design firm has applied Federal sustainable design principles to their design and include certification that the design complies with Federal performance standards for energy efficiency (10 CFR Part 434). Energy Efficiency/Sustainable Design Reports are sent to the Federal Energy Management Program for coordination within DOE after completion of the Title II design. The minimum elements of the reports are as follows.
 - a. Energy Efficiency Compliance with 10 CFR 434
 - (1) Completed compliance summary and worksheet forms certified by the design firm or by site engineering professionals if the design is accomplished in-house as provided in the *Federal User's Manual, Performance Standards for New Commercial and Multifamily High-Rise Residential Buildings*.
 - (2) Description of energy efficiency features included in the design.
 - b. Site Responsiveness
 - (1) Description of features to minimize the impact of the building location on local ecosystems.
 - (2) Description of transportation energy use by proposed occupants and visitors.
 - (3) Description of the reuse or rehabilitation of existing structures to conserve materials.
 - c. Water Conservation
 - (1) Description of features to reduce, control, or treat site runoff.

- (2) Description of features to use water efficiently through appliance/fixture specifications.
 - (3) Description of features to minimize waste treatment and recycle or reuse water.
 - d. Materials Sensitivity
 - (1) Description of features that specify durable, low-energy content or nontoxic materials.
 - (2) Description of features that specify reused and recycle materials.
 - e. Healthiness
 - (1) Description of features that specify materials low in pollutants or toxins.
 - (2) Description of features to ensure adequate ventilation.
 - f. Environmental Releases
 - (1) Description of measures adopted in design to prevent air emissions.
 - (2) Description of measures adopted in design to eliminate or minimize waste generation.
 - (3) Economic impacts/benefits of the adopted pollution prevention measures.
- 4. RESOURCES.
 - 1. *Federal User's Manual, Performance Standards for New Commercial and Multifamily High-Rise Residential Buildings.* The *Federal User's Manual* explains Federal performance standards for energy efficiency and contains compliance forms.
 - 2. *Whole Building Design Guide*, <http://www.wbdg.org>. This is the Federal Guide. It includes strategies to achieve sustainable design.
 - 3. *Roadmap for Integrating Sustainable Design into Site-Level Operations*, <http://www.pnl.gov/doesustainabledesign>. The Web site assists DOE facilities with applying sustainable design principles to their daily operations. It addresses the application of sustainable design principles to research, production, and environmental restoration processes and activities.